



U.S. Environmental Protection Agency
Region 8
Technical and Management Services

Laboratory Services Program

Certificate of Analysis: Preliminary Report

Ref: 8TMS-L

MEMORANDUM

Date: 08/07/15

Subject: Analytical Results--- **Upper Animas_Surface Water_AUG 2015_A096 / A-098**

From: Don Goodrich; EPA Region8 Analytical Chemistry WAM

To: Paula Schmitt
Superfund
8 EPR-SR

Received Sample Set(s), [Work Order : Date Received]:
[C150801 : 08/06/2015]

Attached are the analytical results for the samples received from the Upper Animas_Surface Water_AUG 2015_A096 sampling event, according to TDF A-098. All analyses were performed within their method specified holding times unless otherwise noted in the following narrative.

These samples were prepared, analyzed, and verified by the Environmental Services Assistance Team Laboratory (ESAT) according to the requirements of the Technical Direction Form (TDF).

Note: The laboratory herewith transmits this deliverable to the program/project partner for determination of "final data usability" which may include data validation and data quality assessment per and in accordance with EPA QA/G-8, *Guidance on Environmental Data Verification and Data Validation*, November 2002, EPA/240/R-02/004. Laboratory data qualifiers are applied based on the USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, referred to as "NFGI".

Laboratory policy is to dispose of any remaining sample 60 days after data analysis packages are delivered to EPA. If you would like the laboratory to retain the samples for a period longer than 60 days, please contact Don Goodrich within the 60 day period at (303) 312-6687.

Case Narrative

C150801

Quality Assessment: Unless indicated by exception, the QA/QC associated with this sample set produced data within the TDF-specified criteria.

Holding Times: All samples were analyzed within their method-specified technical holding time(s).

1. Initial and Continuing calibration blanks (ICBs and CCBs).
Exceptions: None.
2. Preparation (PB) / Method blanks (MB)
Exceptions: None.
3. Interference Checks (ICSA / ICSAB) for ICP-MS and ICP-OE analyses only.
Exceptions: None.
4. Initial and Continuing calibration verification analyses (ICVs, SCVs and CCVs).
Exceptions: None.
5. Laboratory Control Sample (LCS) or second source analysis or SRM.
Exceptions: None.
6. Laboratory Fortified blank (LFB) / Blank spike (BS), same source as used for the matrix spikes.
PBS performed with analyses/methods requiring preparation or digestion prior to analysis.
Exceptions: None.
7. Contract Reporting Detection Limit Standard, labeled as CRA, CRDL or CRL.
Exceptions: None.
8. Laboratory Duplicate (DUP). "Source" identifies field sample duplicated in the laboratory. If either the "source" or the duplicate result is <5X the reporting limit, the %D limit of 20% does not apply.
Exceptions: None.
9. Laboratory Matrix Spike (MS) and spike duplicate (MSD). "Source" defines original field sample fortified prior to analysis. Percent recovery (%R) limits do not apply when sample concentration(s) exceed the corresponding analyte spike level by a factor of 4 or greater.
Exceptions: None.
10. Serial Dilution sample analysis (SRD). "Source" is parent field sample diluted 1:5 in the laboratory. Performed for ICP-OE and ICP-MS metals analyses. Percent difference (%D) limits do not apply when analyte concentration(s) are below 50x the source sample's MDL (or 10x it's PQL).
Exceptions: None.
11. Internal standards, criteria specified for ICP-MS analyses only, monitored at the instrument.
Exceptions: None.
12. Any calibration using more than two-points produced a correlation coefficient equal to or greater than 0.995.
Exceptions: None.

Acronyms and Definitions:

ESAT	Environmental Services Assistance Team
J	Data Estimated qualifier (also applied to all data less than PQL, greater than or equal to MDL)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit, also known as reporting limit.
RPD	Relative Percent Difference (difference divided by the mean)
%D	Percent difference, serial dilution criteria unit, difference divided by the original result
%R	Percent recovery, analyzed (less sample contribution) divided by true value
<	Analyte NOT DETECTED at or above the Method Detection Limit(MDL)
mg/L	Parts per million (milligrams per liter). Solids equivalent = mg/Kg.
ug/L	Parts per billion (micrograms per liter). Solids equivalent = ug/Kg.
NR	No Recovery (matrix spike) - Often seen for calcium/magnesium when their concentration exceeds the spike level by > 4x.
NFGI	USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review/October 2004
RE	Sample Re-analysis. Usually seen on raw data and sequences for required sample dilutions due to over-range analytes.
U	Analyte not detected at or above MDL qualifier
D	Diluted value qualifier.

Method(s) Summary :

As defined in the Technical Direction Form (TDF), some or all of the methods listed below were used for the determination of the reported target analytes.

From EPA's *Methods for the Determination of Metals in Environmental Samples*, Supplement I, May 1994, dissolved, total, and/or total recoverable metals were determined by:

- Method 200.7 / 6010B using a PE Optima ICP -OE (ICP).
- Method 200.8 / 6020 using a Perkin -Elmer Elan 6000 ICP -MS.
- Method 200.2 for total recoverable metals (only) digestion.
- Method 245.1 using a Perkin -Elmer FIMS CV AA (aqueous mercury only).

From *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, Method 2340B was used for the calculated hardness determination. Hardness is reported as mg (milligram) equivalent CaCO₃ per liter (L) determined as follows:

$$\text{Calculated hardness} = 2.497 * (\text{Calcium, mg/L}) + 4.118 * (\text{Magnesium, mg/L}).$$

From EPA's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846,

- Method 3015A was used for microwave assisted total metals digestion.
- Method 7473 was used for mercury in solids.

From EPA's *Determination of Inorganic Anions by Ion Chromatography*, Revision 2.1, 1993, Method 300.0 was used to determine the anions.

From EPA's *Methods for Chemical Analysis of Water and Wastes*, March 1983:

- Method 310.1 was followed for the alkalinity determination.
- Method 160.1 was followed for gravimetric total dissolved solids (TDS) determination.
- Method 160.2 was used for gravimetric total suspended solids (TSS) determination.
- Method 415.3 was used for total organic carbon (TOC) determination using either an Apollo 9000 or Phoenix 8000 Non-Dispersive IR (NDIR) system. Also known as dissolved organic carbon (DOC) when performed on the dissolved sample fraction.

The quality control procedures listed in the TDF request were utilized by ESAT to verify accuracy of the results and to evaluate any matrix interferences.

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: 32nd St Bridge

Date / Time Sampled: 08/06/15 09:45

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-02 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	< 50.0	U	ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	52200		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	7120		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	97.8		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	1890		ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	11000		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	49.1		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	45.7		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.190	J	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	2.47		ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	0.307		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	1.62		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	0.115	J	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	160		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: 32nd St Bridge

Date / Time Sampled: 08/05/15 20:50

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-04 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	< 50.0	U	ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	51200		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	7280		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	105		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	1960		ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	11400		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	43.5		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	0.628	J	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	48.2		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.178	J	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	3.06		ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	0.321		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	1.70		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	0.240		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	158		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: 32nd St Bridge

Date / Time Sampled: 08/06/15 00:40

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-06 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	< 50.0	U	ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	51400		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	7350		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	105		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	2020		ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	11600		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	37.8		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	0.603	J	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	49.3		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.160	J	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	3.00		ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	0.332		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	1.56		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	< 0.200	U	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	159		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A68

Date / Time Sampled: 08/05/15 16:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-08 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	55.1		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	36400		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	2580		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	737		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	535	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	1750		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	199		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	21.3		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.828		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	1.08	J	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	0.340		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	3.45		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	0.232		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	1.51		ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	101		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A68

Date / Time Sampled: 08/06/15 06:15

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-10 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	30.5	J	ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	36900		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	2610		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	817		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	514	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	1720		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	326		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	21.8		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.850		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	0.405		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	3.26		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	0.329		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	1.40		ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	103		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A68

Date / Time Sampled: 08/05/15 19:15

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-12 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	45.6	J	ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	37200		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	2560		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	727		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	530	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	1720		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	238		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	21.9		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.815		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	0.371		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	3.16		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	0.283		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	1.44		ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	103		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A68

Date / Time Sampled: 08/05/15 23:30

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-14 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	31.0	J	ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	36700		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	2580		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	757		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	515	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	1740		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	324		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	22.5		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.974		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	1.23	J	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	0.375		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	3.52		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	0.820		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	1.48		ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	102		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/05/15 16:15

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-16 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	12000		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	4.50	J	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	95400		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	5840		ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	8030		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	6650		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	1520		ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	2600		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	4020		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	0.797	J	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	22.6		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	15.2		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	32.1		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	1410		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	50.7		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	13.8		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	1.14	J	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	271		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/05/15 13:45

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-18 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	513		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	61300		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	4590		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	1370		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	691	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	2400		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	699		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	20.2		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	1.81		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	5.75		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	9.27		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	0.225		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	2.87		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	172		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/06/15 06:30

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-20 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	< 50.0	U	ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	50700		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	1980		ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	4030		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	1160		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	605	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	2310		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	609		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	21.5		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	2.11		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	4.69		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	7.63		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	< 0.200	U	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	2.72		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	143		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/05/15 20:10

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-22 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	1370		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	55700		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	3170		ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	4650		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	1810		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	721	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	2310		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	1210		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	21.6		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	4.29		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	7.98		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	205		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	3.12		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	4.04		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	158		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/05/15 23:50

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-24 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	59.1		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	51000		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	2090		ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	4170		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	1320		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	631	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	2330		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	733		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	20.8		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	2.59		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	5.40		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	11.4		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	0.118	J	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	2.69		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	144		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: Bakers Bridge

Date / Time Sampled: 08/06/15 00:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-26 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	43.9	J	ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	32600		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	3920		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	296		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	646	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	1790		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	110		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	29.9		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.336		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	1.08		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	1.88		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	< 0.200	U	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	0.788	J	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	98		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: Bakers Bridge

Date / Time Sampled: 08/06/15 09:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-28 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	904		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	46500		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	189	J	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	5300		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	2090		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	912	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	1960		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	1700		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	30.3		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	5.32		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	9.32		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	189		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	1.56		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	5.39		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	138		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: Bakers Bridge

Date / Time Sampled: 08/05/15 20:05

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-30 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	52.3		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	< 5.00	U	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	32600		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	< 250	U	ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	3990		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	306		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	631	J	ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	1790		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	85.8		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Arsenic	< 2.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Barium	29.8		ug/L	5.00	1	08/07/2015	SV	1508027
200.8	Cadmium	0.353		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Chromium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Cobalt	1.02		ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Copper	2.28		ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Lead	< 0.200	U	ug/L	0.100	1	08/07/2015	SV	1508027
200.8	Molybdenum	< 1.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Nickel	0.646	J	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Selenium	< 2.00	U	ug/L	1.00	1	08/07/2015	SV	1508027
200.8	Silver	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Thallium	< 1.00	U	ug/L	0.500	1	08/07/2015	SV	1508027
200.8	Vanadium	< 3.00	U	ug/L	2.00	1	08/07/2015	SV	1508027
2340B	Hardness	98		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: CC48

Date / Time Sampled: 08/06/15 06:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-32 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	10100		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	2.65	J	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	156000		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	20000		ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	10900		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	6720		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	1410		ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	3690		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	4650		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Barium	< 50.0	U	ug/L	25.0	5	08/07/2015	SV	1508027
200.8	Cadmium	14.2		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Cobalt	30.7		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Copper	786		ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Lead	30.0		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Nickel	15.8		ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508027
2340B	Hardness	433		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: CC48

Date / Time Sampled: 08/05/15 23:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-34 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	14400		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	4.31	J	ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	167000		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	21300		ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	12300		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	8020		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	1600		ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	3660		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	5820		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Barium	< 50.0	U	ug/L	25.0	5	08/07/2015	SV	1508027
200.8	Cadmium	19.1		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Cobalt	36.2		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Copper	1130		ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Lead	54.1		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Nickel	18.2		ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508027
2340B	Hardness	467		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: CC48

Date / Time Sampled: 08/05/15 19:25

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-36 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	23900		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	9.29		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	190000		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	27000		ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	15400		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	10900		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	2160		ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	3930		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	8540		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Barium	25.7	J	ug/L	25.0	5	08/07/2015	SV	1508027
200.8	Cadmium	30.6		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Cobalt	54.4		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Copper	2260		ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Lead	73.9		ug/L	0.500	5	08/07/2015	SV	1508027
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Nickel	28.8		ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508027
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508027
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508027
2340B	Hardness	537		mg/L	2	1	08/07/2015	SV	1508026

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods

Station ID: Cement Creek 14th St Bridge

Date / Time Sampled: 08/05/15 16:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-38 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.7	Aluminum	91900		ug/L	20.0	1	08/07/2015	SV	1508026
200.7	Beryllium	34.8		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Calcium	461000		ug/L	100	1	08/07/2015	SV	1508026
200.7	Iron	49500		ug/L	100	1	08/07/2015	SV	1508026
200.7	Magnesium	36500		ug/L	100	1	08/07/2015	SV	1508026
200.7	Manganese	37100		ug/L	2.00	1	08/07/2015	SV	1508026
200.7	Potassium	6630		ug/L	250	1	08/07/2015	SV	1508026
200.7	Sodium	4960		ug/L	250	1	08/07/2015	SV	1508026
200.7	Zinc	26800		ug/L	10.0	1	08/07/2015	SV	1508026
200.8	Antimony	< 10.0	U	ug/L	5.00	10	08/07/2015	SV	1508027
200.8	Arsenic	< 20.0	U	ug/L	5.00	10	08/07/2015	SV	1508027
200.8	Barium	< 100	U	ug/L	50.0	10	08/07/2015	SV	1508027
200.8	Cadmium	98.3		ug/L	1.00	10	08/07/2015	SV	1508027
200.8	Chromium	< 20.0	U	ug/L	10.0	10	08/07/2015	SV	1508027
200.8	Cobalt	204		ug/L	1.00	10	08/07/2015	SV	1508027
200.8	Copper	10400		ug/L	5.00	10	08/07/2015	SV	1508027
200.8	Lead	150		ug/L	1.00	10	08/07/2015	SV	1508027
200.8	Molybdenum	< 10.0	U	ug/L	10.0	10	08/07/2015	SV	1508027
200.8	Nickel	91.5		ug/L	5.00	10	08/07/2015	SV	1508027
200.8	Selenium	< 20.0	U	ug/L	10.0	10	08/07/2015	SV	1508027
200.8	Silver	< 10.0	U	ug/L	5.00	10	08/07/2015	SV	1508027
200.8	Thallium	< 10.0	U	ug/L	5.00	10	08/07/2015	SV	1508027
200.8	Vanadium	< 30.0	U	ug/L	20.0	10	08/07/2015	SV	1508027
2340B	Hardness	1300		mg/L	2	1	08/07/2015	SV	1508026

"J" Qualifier indicates an estimated value

Project Name: Upper Animas_Surface Water_AUG 2015_A096

Certificate of Analysis

TDF #: A-098

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	% R	% R Limits	% D or RPD	% D or RPD Limit
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ICPMS-PE DRC-II

Batch 1508027 - No Lab Prep Req'd

Water

ICPMS-PE DRC-II

Method Blank (1508027-BLK1)	Dilution Factor: 1	Prepared & Analyzed: 08/07/15
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Vanadium	< 2.00	3.00	ug/L
Chromium	< 1.00	2.00	"
Cobalt	< 0.100	0.200	"
Nickel	< 0.500	1.00	"
Copper	< 0.500	1.00	"
Arsenic	< 0.500	2.00	"
Selenium	< 1.00	2.00	"
Molybdenum	< 1.00	1.00	"
Silver	< 0.500	1.00	"
Cadmium	< 0.100	0.200	"
Antimony	< 0.500	1.00	"
Barium	< 5.00	10.0	"
Thallium	< 0.500	1.00	"
Lead	< 0.100	0.200	"

Method Blank Spike (1508027-BS1)	Dilution Factor: 1	Prepared & Analyzed: 08/07/15
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Vanadium	93.1	3.00	ug/L	100	93	85-115
Chromium	93.3	2.00	"	100	93	85-115
Cobalt	94.7	0.200	"	100	95	85-115
Nickel	93.1	1.00	"	100	93	85-115
Copper	93.0	1.00	"	100	93	85-115
Arsenic	99.8	2.00	"	100	100	85-115
Selenium	520	2.00	"	500	104	85-115
Molybdenum	94.4	1.00	"	100	94	85-115
Silver	93.5	1.00	"	100	93	85-115
Cadmium	95.8	0.200	"	100	96	85-115
Antimony	98.1	1.00	"	100	98	85-115
Barium	97.1	10.0	"	100	97	85-115
Thallium	97.6	1.00	"	100	98	85-115
Lead	97.2	0.200	"	100	97	85-115

Project Name: Upper Animas_Surface Water_AUG 2015_A096

Certificate of Analysis

TDF #: A-098

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	% R	% R Limits	% D or RPD	% D or RPD Limit
Batch 1508027 - No Lab Prep Req'd				Water		ICPMS-PE DRC-II			
Duplicate (1508027-DUP1)		Dilution Factor: 1		Source: C150801-02		Prepared & Analyzed: 08/07/15			
Vanadium	< 2.00	3.00	ug/L		< 2.00				20
Chromium	2.67	2.00	"		2.47			8	20
Cobalt	0.286	0.200	"		0.307			7	20
Nickel	< 0.500	1.00	"		< 0.500				20
Copper	1.70	1.00	"		1.62			5	20
Arsenic	< 0.500	2.00	"		< 0.500				20
Selenium	< 1.00	2.00	"		< 1.00				20
Molybdenum	< 1.00	1.00	"		< 1.00				20
Silver	< 0.500	1.00	"		< 0.500				20
Cadmium	0.169	0.200	"		0.190			11	20
Antimony	< 0.500	1.00	"		< 0.500				20
Barium	46.6	10.0	"		45.7			2	20
Thallium	< 0.500	1.00	"		< 0.500				20
Lead	0.104	0.200	"		0.115			10	20
Matrix Spike (1508027-MS1)		Dilution Factor: 1		Source: C150801-02		Prepared & Analyzed: 08/07/15			
Vanadium	90.5	3.00	ug/L	100	< 2.00	91	70-130		
Chromium	90.4	2.00	"	100	2.47	88	70-130		
Cobalt	92.2	0.200	"	100	0.307	92	70-130		
Nickel	87.6	1.00	"	100	< 0.500	88	70-130		
Copper	89.9	1.00	"	100	1.62	88	70-130		
Arsenic	104	2.00	"	100	< 0.500	104	70-130		
Selenium	570	2.00	"	500	< 1.00	114	70-130		
Molybdenum	98.0	1.00	"	100	< 1.00	98	70-130		
Silver	86.1	1.00	"	100	< 0.500	86	70-130		
Cadmium	98.7	0.200	"	100	0.190	98	70-130		
Antimony	101	1.00	"	100	< 0.500	101	70-130		
Barium	141	10.0	"	100	45.7	95	70-130		
Thallium	96.9	1.00	"	100	< 0.500	97	70-130		
Lead	95.8	0.200	"	100	0.115	96	70-130		

Project Name: Upper Animas_Surface Water_AUG 2015_A096

Certificate of Analysis

TDF #: A-098

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	% R Limits	% D or RPD	% D or RPD Limit
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Batch 1508027 - No Lab Prep Req'd

Water

ICPMS-PE DRC-II

Matrix Spike (1508027-MS2)

Dilution Factor: 1

Source: C150801-04

Prepared & Analyzed: 08/07/15

Vanadium	90.7	3.00	ug/L	100	< 2.00	91	70-130		
Chromium	90.6	2.00	"	100	3.06	88	70-130		
Cobalt	90.2	0.200	"	100	0.321	90	70-130		
Nickel	88.2	1.00	"	100	< 0.500	88	70-130		
Copper	89.8	1.00	"	100	1.70	88	70-130		
Arsenic	103	2.00	"	100	0.628	102	70-130		
Selenium	577	2.00	"	500	< 1.00	115	70-130		
Molybdenum	97.4	1.00	"	100	< 1.00	97	70-130		
Silver	87.5	1.00	"	100	< 0.500	87	70-130		
Cadmium	101	0.200	"	100	0.178	101	70-130		
Antimony	100	1.00	"	100	< 0.500	100	70-130		
Barium	141	10.0	"	100	48.2	93	70-130		
Thallium	96.4	1.00	"	100	< 0.500	96	70-130		
Lead	93.8	0.200	"	100	0.240	94	70-130		

Batch 1508031 - 1508027

Water

ICPMS-PE DRC-II

Serial Dilution (1508031-SRD1)

Dilution Factor: 5

Source: C150801-02

Prepared & Analyzed: 08/07/15

Vanadium	< 10.0	15.0	ug/L		< 2.00				10
Chromium	< 5.00	10.0	"		2.47				10
Cobalt	< 0.500	1.00	"		0.307				10
Nickel	< 2.50	5.00	"		< 0.50				10
Copper	< 2.50	5.00	"		1.62				10
Arsenic	< 2.50	10.0	"		< 0.50				10
Selenium	< 5.00	10.0	"		< 1.00				10
Molybdenum	< 5.00	5.00	"		< 1.00				10
Silver	< 2.50	5.00	"		< 0.50				10
Cadmium	< 0.500	1.00	"		0.190				10
Antimony	< 2.50	5.00	"		< 0.50				10
Barium	46.1	50.0	"		45.7			0.8	10
Thallium	< 2.50	5.00	"		< 0.50				10
Lead	< 0.500	1.00	"		0.115				10

Project Name: Upper Animas_Surface Water_AUG 2015_A096

Certificate of Analysis

TDF #: A-098

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	% R Limits	% D or RPD	% D or RPD Limit
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ICPOE - PE Optima

Batch 1508026 - No Lab Prep Req'd

Water

ICPOE - PE Optima

Method Blank (1508026-BLK1)

Dilution Factor: 1

Prepared & Analyzed: 08/07/15

Aluminum	< 20.0	50.0	ug/L
Beryllium	< 2.00	5.00	"
Calcium	< 100	250	"
Iron	< 100	250	"
Potassium	< 250	1000	"
Magnesium	< 100	250	"
Manganese	< 2.00	5.00	"
Sodium	< 250	1000	"
Zinc	< 10.0	20.0	"

Method Blank Spike (1508026-BS1)

Dilution Factor: 1

Prepared & Analyzed: 08/07/15

Aluminum	10430	50.0	ug/L	10100	103	85-115
Beryllium	100.4	5.00	"	100	100	85-115
Calcium	10010	250	"	10100	99	85-115
Iron	10300	250	"	10100	102	85-115
Potassium	10790	1000	"	10100	107	85-115
Magnesium	10420	250	"	10100	103	85-115
Manganese	101.9	5.00	"	100	102	85-115
Sodium	10660	1000	"	10100	106	85-115
Zinc	110.2	20.0	"	100	110	85-115

Duplicate (1508026-DUP1)

Dilution Factor: 1

Source: C150801-02

Prepared & Analyzed: 08/07/15

Aluminum	< 20.0	50.0	ug/L	< 20.0		20
Beryllium	< 2.00	5.00	"	< 2.00		20
Calcium	51500	250	"	52200	1	20
Iron	< 100	250	"	< 100		20
Potassium	1907	1000	"	1895	0.6	20
Magnesium	7154	250	"	7120	0.5	20
Manganese	97.91	5.00	"	97.78	0.1	20
Sodium	11170	1000	"	10980	2	20
Zinc	42.91	20.0	"	49.13	14	20

Project Name: Upper Animas_Surface Water_AUG 2015_A096

Certificate of Analysis

TDF #: A-098

Preliminary Report

Metals (Dissolved) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	% R	% R Limits	% D or RPD	% D or RPD Limit
Batch 1508026 - No Lab Prep Req'd			Water				ICPOE - PE Optima		
Matrix Spike (1508026-MS1)		Dilution Factor: 1	Source: C150801-02		Prepared & Analyzed: 08/07/15				
Aluminum	10590	50.0	ug/L	10100	< 20.0	105	70-130		
Beryllium	101.4	5.00	"	100	< 2.00	101	70-130		
Calcium	60670	250	"	10100	52200	84	70-130		
Iron	10400	250	"	10100	< 100	103	70-130		
Potassium	12860	1000	"	10100	1895	109	70-130		
Magnesium	17840	250	"	10100	7120	106	70-130		
Manganese	199.1	5.00	"	100	97.78	101	70-130		
Sodium	22020	1000	"	10100	10980	109	70-130		
Zinc	156.3	20.0	"	100	49.13	107	70-130		
Matrix Spike (1508026-MS2)		Dilution Factor: 1	Source: C150801-04		Prepared & Analyzed: 08/07/15				
Aluminum	10880	50.0	ug/L	10100	< 20.0	108	70-130		
Beryllium	103.5	5.00	"	100	< 2.00	104	70-130		
Calcium	61880	250	"	10100	51170	106	70-130		
Iron	10450	250	"	10100	< 100	103	70-130		
Potassium	13010	1000	"	10100	1960	109	70-130		
Magnesium	18120	250	"	10100	7281	107	70-130		
Manganese	209.5	5.00	"	100	105.3	104	70-130		
Sodium	22080	1000	"	10100	11430	105	70-130		
Zinc	150.9	20.0	"	100	43.50	107	70-130		
Batch 1508030 - 1508026			Water				ICPOE - PE Optima		
Serial Dilution (1508030-SRD1)		Dilution Factor: 5	Source: C150801-02		Prepared & Analyzed: 08/07/15				
Aluminum	< 100	250	ug/L		< 20.00				10
Beryllium	< 10.0	25.0	"		< 2.00				10
Calcium	49280	1250	"		52200			6	10
Iron	< 500	1250	"		< 100.00				10
Potassium	1898	5000	"		1895			0.2	10
Magnesium	6847	1250	"		7120			4	10
Manganese	96.79	25.0	"		97.78			1	10
Sodium	10950	5000	"		10980			0.3	10
Zinc	< 50.0	100	"		49.13				10

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
 RPD = Relative Percent Difference %D = % Difference, DL = Detection Limit for QC sample

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis
Preliminary ReportTechLaw Inc, ESAT Region8
INORGANIC ANALYSES DATA SHEET
Initial and Continuing Calibration Blanks

Analytical Method: 200.7

Analysis Name: ICPOE Diss. Metals

Instrument: ICPOE - PE Optima

Work Order: Nu C150801

Analytical Sequence: 1508030 Dissolved

Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Aluminum	0.42	1	2	3	4	1508026-BLK1	NA	50.00
		1.22	0.08	-1.46		-2.08	NA	
		5	6	7	8			
Beryllium	-0.16	1	2	3	4	1508026-BLK1	NA	5.00
		-0.41	-0.27	-0.37		-0.29	NA	
		5	6	7	8			
Calcium	8.16	1	2	3	4	1508026-BLK1	NA	250.00
		7.79	7.01	6.13		-5.41	NA	
		5	6	7	8			
Iron	-1.01	1	2	3	4	1508026-BLK1	NA	250.00
		0.24	-0.07	-0.60		-1.09	NA	
		5	6	7	8			
Potassium	8.90	1	2	3	4	1508026-BLK1	NA	1,000.00
		9.87	9.09	3.57		3.39	NA	
		5	6	7	8			
Magnesium	-0.37	1	2	3	4	1508026-BLK1	NA	250.00
		-0.68	-1.00	-0.77		-1.77	NA	
		5	6	7	8			
Manganese	0.16	1	2	3	4	1508026-BLK1	NA	5.00
		0.04	0.11	0.43		0.08	NA	
		5	6	7	8			
Sodium	-4.94	1	2	3	4	1508026-BLK1	NA	1,000.00
		-3.34	-2.43	0.33		-11.08	NA	
		5	6	7	8			

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis
Preliminary Report

TechLaw Inc, ESAT Region8
INORGANIC ANALYSES DATA SHEET
Intial and Continuing Calibration Blanks

Analytical Method: 200.7

Analysis Name: ICPOE Diss. Metals

Instrument: ICPOE - PE Optima

Work Order: Nu C150801

Analytical Sequence: 1508030 **Dissolved**

Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Zinc	-14.62	1	2	3	4	1508026-BLK1	NA	20.00
		-12.81	-7.42	-4.57		-3.75	NA	
	5	6	7	8				

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis
Preliminary ReportTechLaw Inc, ESAT Region8
INORGANIC ANALYSES DATA SHEET
Initial and Continuing Calibration Blanks

Analytical Method: 200.8

Analysis Name: ICPMS Diss. Metals

Instrument: ICPMS-PE DRC-II

Work Order: Nu C150801

Analytical Sequence: 1508031 Dissolved

Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Vanadium	0.04	1	2	3	4	1508027-BLK1	NA	3.00
		0.07	0.19	0.10		0.00	NA	
		5	6	7	8			
Chromium	-0.02	1	2	3	4	1508027-BLK1	NA	2.00
		0.05	0.00	0.04		0.02	NA	
		5	6	7	8			
Cobalt	0.01	1	2	3	4	1508027-BLK1	NA	0.20
		0.01	0.01	0.02		-0.01	NA	
		5	6	7	8			
Nickel	0.01	1	2	3	4	1508027-BLK1	NA	1.00
		0.02	0.03	0.02		-0.01	NA	
		5	6	7	8			
Copper	-0.03	1	2	3	4	1508027-BLK1	NA	1.00
		-0.03	0.00	0.01		-0.09	NA	
		5	6	7	8			
Arsenic	0.06	1	2	3	4	1508027-BLK1	NA	2.00
		-0.01	0.07	-0.03		0.02	NA	
		5	6	7	8			
Selenium	0.15	1	2	3	4	1508027-BLK1	NA	2.00
		-0.18	0.11	-0.06		0.12	NA	
		5	6	7	8			
Molybdenum	0.03	1	2	3	4	1508027-BLK1	NA	1.00
		0.05	0.04	0.05		0.09	NA	
		5	6	7	8			

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis
Preliminary ReportTechLaw Inc, ESAT Region8
INORGANIC ANALYSES DATA SHEET
Initial and Continuing Calibration Blanks

Analytical Method: 200.8

Analysis Name: ICPMS Diss. Metals

Instrument: ICPMS-PE DRC-II

Work Order: Nu C150801

Analytical Sequence: 1508031 Dissolved

Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Silver	0.02	1	2	3	4	1508027-BLK1	NA	1.00
		0.03	0.03	0.03		0.00	NA	
	5	6	7	8				
Cadmium	0.01	1	2	3	4	1508027-BLK1	NA	0.20
		0.00	0.03	0.03		-0.02	NA	
	5	6	7	8				
Antimony	0.08	1	2	3	4	1508027-BLK1	NA	1.00
		0.17	0.20	0.20		0.13	NA	
	5	6	7	8				
Barium	0.01	1	2	3	4	1508027-BLK1	NA	10.00
		0.00	0.02	0.01		-0.02	NA	
	5	6	7	8				
Thallium	0.01	1	2	3	4	1508027-BLK1	NA	1.00
		0.00	0.00	0.00		-0.06	NA	
	5	6	7	8				
Lead	0.01	1	2	3	4	1508027-BLK1	NA	0.20
		0.01	0.02	0.02		-0.01	NA	
	5	6	7	8				

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima

Method: 200.7

Analysis Name: ICPOE Diss. Metals

Sequence: 1508030

Work Order: C150801

Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Aluminum	12500	12530	100.2		1			2			3	
				12500	13080	104.6	12500	13210	105.7	12500	13040	104.3
					4			5			6	
					7			8			9	
Beryllium	500	513.8	102.8		1			2			3	
				500	517.7	103.5	500	526.8	105.4	500	517.1	103.4
					4			5			6	
					7			8			9	
Calcium	12500	12360	98.9		1			2			3	
				12500	12420	99.4	12500	12360	98.9	12500	12410	99.3
					4			5			6	
					7			8			9	
Iron	12500	12510	100.1		1			2			3	
				12500	12710	101.7	12500	12740	101.9	12500	13120	105.0
					4			5			6	
					7			8			9	
Magnesium	12500	12670	101.4		1			2			3	
				12500	13020	104.2	12500	13060	104.5	12500	12850	102.8
					4			5			6	
					7			8			9	
Manganese	1000	1010	101.0		1			2			3	
				1000	1042	104.2	1000	1071	107.1	1000	1063	106.3
					4			5			6	
					7			8			9	

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPOE - PE Optima

Method: 200.7

Analysis Name: ICPOE Diss. Metals

Sequence: 1508030

Work Order: C150801

Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Potassium	25000	25620	102.5	1			2			3		
				25000	26440	105.8	25000	26150	104.6	25000	25750	103.0
				4			5			6		
				7			8			9		
Sodium	12500	12900	103.2	1			2			3		
				12500	13240	105.9	12500	13280	106.2	12500	12960	103.7
				4			5			6		
				7			8			9		
Zinc	2500	2593	103.7	1			2			3		
				2500	2641	105.6	2500	2741	109.6	2500	2746	109.8
				4			5			6		
				7			8			9		

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria -ICV = 90 - 110%, CCV = 80 - 120%.

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II

Method: 200.8

Analysis Name: ICPMS Diss. Metals

Sequence: 1508031

Work Order: C150801

Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Antimony	50.0	50.1	100.2		1			2			3	
				50.0	48.6	97.2	50.0	49.3	98.6	50.0	49.6	99.2
					4			5			6	
					7			8			9	
Arsenic	50.0	51.5	103.0		1			2			3	
				50.0	51.1	102.2	50.0	52.1	104.2	50.0	50.5	101.0
					4			5			6	
					7			8			9	
Barium	50.0	49.8	99.6		1			2			3	
				50.0	50.2	100.4	50.0	50.0	100.0	50.0	52.1	104.2
					4			5			6	
					7			8			9	
Cadmium	50.0	49.5	99.0		1			2			3	
				50.0	51.1	102.2	50.0	51.6	103.2	50.0	50.6	101.2
					4			5			6	
					7			8			9	
Chromium	50.0	48.4	96.8		1			2			3	
				50.0	48.4	96.8	50.0	47.7	95.4	50.0	48.0	96.0
					4			5			6	
					7			8			9	
Cobalt	50.0	50.0	100.0		1			2			3	
				50.0	48.8	97.6	50.0	49.0	98.0	50.0	50.4	100.8
					4			5			6	
					7			8			9	

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II

Method: 200.8

Analysis Name: ICPMS Diss. Metals

Sequence: 1508031

Work Order: C150801

Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Copper	50.0	48.9	97.8		1			2			3	
				50.0	46.5	93.0	50.0	47.4	94.8	50.0	48.5	97.0
					4			5			6	
					7			8			9	
Lead	50.0	49.2	98.4		1			2			3	
				50.0	50.2	100.4	50.0	50.2	100.4	50.0	49.5	99.0
					4			5			6	
					7			8			9	
Molybdenum	50.0	49.3	98.6		1			2			3	
				50.0	50.8	101.6	50.0	51.0	102.0	50.0	51.9	103.8
					4			5			6	
					7			8			9	
Nickel	50.0	48.5	97.0		1			2			3	
				50.0	47.4	94.8	50.0	48.7	97.4	50.0	49.2	98.4
					4			5			6	
					7			8			9	
Selenium	50.0	53.0	106.0		1			2			3	
				50.0	52.0	104.0	50.0	51.4	102.8	50.0	52.0	104.0
					4			5			6	
					7			8			9	
Silver	50.0	48.9	97.8		1			2			3	
				50.0	50.0	100.0	50.0	49.9	99.8	50.0	50.3	100.6
					4			5			6	
					7			8			9	

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II

Method: 200.8

Analysis Name: ICPMS Diss. Metals

Sequence: 1508031

Work Order: C150801

Units: ug/L

Dissolved Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Thallium	50.0	49.8	99.6	1			2			3		
				50.0	49.8	99.6	50.0	49.3	98.6	50.0	50.1	100.2
				4			5			6		
				7			8			9		
Vanadium	50.0	48.5	97.0	1			2			3		
				50.0	48.7	97.4	50.0	48.4	96.8	50.0	48.3	96.6
				4			5			6		
				7			8			9		

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria -ICV = 90 - 110%R, CCV = 80 - 120%R.

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

<u>Analyte</u>	<u>Check Sample</u>	<u>Result*</u>	<u>Units</u>	<u>True</u>	<u>%R</u>	<u>PQL</u>
Sequence: 1508031	Analysis: ICPMS Diss. Metals					
Antimony	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Arsenic	IFA1	0.0	ug/L			2.00
	IFB1	19.9	ug/L	20	100	2.00
Barium	IFA1	0.0	ug/L			10.0
	IFB1	0.1	ug/L			10.0
Cadmium	IFA1	0.0	ug/L			0.200
	IFB1	20.3	ug/L	20	101	0.200
Chromium	IFA1	0.2	ug/L			2.00
	IFB1	20.1	ug/L	20	101	2.00
Cobalt	IFA1	0.0	ug/L			0.200
	IFB1	20.4	ug/L	20	102	0.200
Copper	IFA1	0.5	ug/L			1.00
	IFB1	20.7	ug/L	20	103	1.00
Lead	IFA1	0.0	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Molybdenum	IFA1	197.6	ug/L	200	99	1.00
	IFB1	198.9	ug/L	200	99	1.00
Nickel	IFA1	0.0	ug/L			1.00
	IFB1	20.2	ug/L	20	101	1.00
Selenium	IFA1	0.2	ug/L			2.00
	IFB1	-0.4	ug/L			2.00
Silver	IFA1	0.0	ug/L			1.00
	IFB1	19.1	ug/L	20	96	1.00
Thallium	IFA1	-0.1	ug/L			1.00
	IFB1	-0.1	ug/L			1.00
Vanadium	IFA1	0.2	ug/L			3.00
	IFB1	0.1	ug/L			3.00

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPOE - PE Optima

<u>Analyte</u>	<u>Check Sample</u>	<u>Result*</u>	<u>Units</u>	<u>True</u>	<u>%R</u>	<u>PQL</u>
Sequence: 1508030	Analysis: ICPOE Diss. Metals					
Aluminum	IFA1	62,740.4	ug/L	60,000	105	50.0
	IFB1	64,156.3	ug/L	60,000	107	50.0
Beryllium	IFA1	0.2	ug/L			5.00
	IFB1	100.7	ug/L	100	101	5.00
Calcium	IFA1	313,635.0	ug/L	300,000	105	250
	IFB1	316,600.2	ug/L	300,000	106	250
Iron	IFA1	238,165.8	ug/L	250,000	95	250
	IFB1	241,023.9	ug/L	250,000	96	250
Magnesium	IFA1	146,621.4	ug/L	150,000	98	250
	IFB1	149,278.3	ug/L	150,000	100	250
Manganese	IFA1	-0.3	ug/L			5.00
	IFB1	196.6	ug/L	200	98	5.00
Potassium	IFA1	-445.9	ug/L			1000
	IFB1	21,071.8	ug/L	20,000	105	1000
Sodium	IFA1	52,186.3	ug/L	50,000	104	1000
	IFB1	53,093.3	ug/L	50,000	106	1000
Zinc	IFA1	-17.8	ug/L			20.0
	IFB1	265.9	ug/L	300	89	20.0

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

TechLaw, Inc. - ESAT Region 8 Detection Limit (PQL) Standard ICPMS-PE DRC-II				
Metals (Dissolved) by EPA 200/7000 Series Methods				
Sequence: 1508031				
Analyte	True	Found	%R	Units
Antimony	1.00	1.03	103	ug/L
Arsenic	2.00	2.04	102	ug/L
Barium	10.0	9.75	97	ug/L
Cadmium	0.200	0.164	82	ug/L
Chromium	2.00	1.82	91	ug/L
Cobalt	0.200	0.190	95	ug/L
Copper	1.00	0.799	80	ug/L
Lead	0.200	0.186	93	ug/L
Molybdenum	1.00	0.935	94	ug/L
Nickel	1.00	0.976	98	ug/L
Selenium	2.00	1.96	98	ug/L
Silver	1.00	0.957	96	ug/L
Thallium	1.00	0.892	89	ug/L
Vanadium	2.00	1.99	99	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

TechLaw, Inc. - ESAT Region 8

Detection Limit (PQL) Standard

ICPOE - PE Optima

Metals (Dissolved) by EPA 200/7000 Series Methods

Sequence: 1508030

<u>Analyte</u>	<u>True</u>	<u>Found</u>	<u>%R</u>	<u>Units</u>
Aluminum	100	100.6	101	ug/L
Beryllium	5.00	4.710	94	ug/L
Calcium	250	239.5	96	ug/L
Iron	100	99.97	100	ug/L
Magnesium	1000	1009	101	ug/L
Manganese	10.0	10.71	107	ug/L
Potassium	1000	1048	105	ug/L
Sodium	1000	1034	103	ug/L
Zinc	50.0	54.25	109	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

TechLaw Inc, ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.7

Dissolved

Sequence ID#: 1508030

Instrument ID #: ICPOE - PE Optima

Water

LSR #: A-096

Analysis ID	Sample Name	Analysis Date	Analysis Time
1508030-ICV1	Initial Cal Check	08/07/15	07:49
1508030-SCV1	Secondary Cal Check	08/07/15	07:52
1508030-ICB1	Initial Cal Blank	08/07/15	07:55
1508030-CRL1	Instrument RL Check	08/07/15	07:58
1508030-IFA1	Interference Check A	08/07/15	08:02
1508030-IFB1	Interference Check B	08/07/15	08:06
1508026-BLK1	Blank	08/07/15	08:10
1508026-BS1	Blank Spike	08/07/15	08:13
C150801-02	32nd St Bridge	08/07/15	08:17
1508026-DUP1	Duplicate	08/07/15	08:20
1508030-SRD1	Serial Dilution	08/07/15	08:23
1508026-MS1	Matrix Spike	08/07/15	08:26
C150801-04	32nd St Bridge	08/07/15	08:29
1508026-MS2	Matrix Spike	08/07/15	08:33
C150801-06	32nd St Bridge	08/07/15	08:36
1508030-CCV1	Calibration Check	08/07/15	08:42
1508030-CCB1	Calibration Blank	08/07/15	08:46
C150801-08	A68	08/07/15	08:49
C150801-10	A68	08/07/15	08:52
C150801-12	A68	08/07/15	08:55
C150801-14	A68	08/07/15	08:59
C150801-16	A72	08/07/15	09:02
C150801-18	A72	08/07/15	09:05
C150801-20	A72	08/07/15	09:09
C150801-22	A72	08/07/15	09:12
C150801-24	A72	08/07/15	09:15
1508030-CCV2	Calibration Check	08/07/15	09:22
1508030-CCB2	Calibration Blank	08/07/15	09:25
C150801-26	Bakers Bridge	08/07/15	09:28
C150801-28	Bakers Bridge	08/07/15	09:31
C150801-30	Bakers Bridge	08/07/15	09:34
C150801-32	CC48	08/07/15	09:38
C150801-34	CC48	08/07/15	09:41
C150801-36	CC48	08/07/15	09:44
C150801-38	Cement Creek 14th St Bridge	08/07/15	09:48
1508030-CCV3	Calibration Check	08/07/15	09:55
1508030-CCB3	Calibration Blank	08/07/15	09:58

TechLaw Inc, ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8

Dissolved

Sequence ID#: 1508031

Instrument ID #: ICPMS-PE DRC-II

Water

LSR #: A-096

Analysis ID	Sample Name	Analysis Date	Analysis Time
1508031-ICV1	Initial Cal Check	08/07/15	08:33
1508031-SCV1	Secondary Cal Check	08/07/15	08:37
1508031-ICB1	Initial Cal Blank	08/07/15	08:40
1508031-CRL1	Instrument RL Check	08/07/15	08:43
1508031-IFA1	Interference Check A	08/07/15	08:47
1508031-IFB1	Interference Check B	08/07/15	08:50
1508027-BLK1	Blank	08/07/15	08:53
1508027-BS1	Blank Spike	08/07/15	08:56
C150801-02	32nd St Bridge	08/07/15	08:59
1508027-DUP1	Duplicate	08/07/15	09:03
1508031-SRD1	Serial Dilution	08/07/15	09:06
1508027-MS1	Matrix Spike	08/07/15	09:09
C150801-04	32nd St Bridge	08/07/15	09:12
1508027-MS2	Matrix Spike	08/07/15	09:15
C150801-06	32nd St Bridge	08/07/15	09:18
1508031-CCV1	Calibration Check	08/07/15	09:24
1508031-CCB1	Calibration Blank	08/07/15	09:27
C150801-08	A68	08/07/15	09:31
C150801-10	A68	08/07/15	09:34
C150801-12	A68	08/07/15	09:37
C150801-14	A68	08/07/15	09:40
C150801-16	A72	08/07/15	09:43
C150801-18	A72	08/07/15	09:46
C150801-20	A72	08/07/15	09:49
C150801-22	A72	08/07/15	09:52
C150801-24	A72	08/07/15	09:55
1508031-CCV2	Calibration Check	08/07/15	10:02
1508031-CCB2	Calibration Blank	08/07/15	10:05
C150801-26	Bakers Bridge	08/07/15	10:08
C150801-28	Bakers Bridge	08/07/15	10:11
C150801-30	Bakers Bridge	08/07/15	10:14
C150801-32	CC48	08/07/15	10:18
C150801-34	CC48	08/07/15	10:21
C150801-36	CC48	08/07/15	10:24
C150801-38	Cement Creek 14th St Bridge	08/07/15	10:27
1508031-CCV3	Calibration Check	08/07/15	10:33
1508031-CCB3	Calibration Blank	08/07/15	10:36